

REMARKS

The Office Action dated March 16, 2006, and the reference cited therein, have been considered. Claims 1-24 were previously pending. Claims 1-8 and 10-24 have been rejected, and claim 9 is objected to as depending from a rejected claim. No claims currently stand allowed. Applicants have amended the claims to improve their clarity. Applicants note that the prior art, directed to producing spatial information in an axial cross-section (see, Torp Figs. 2 and 4 – and associated written description) does not disclose the recited invention, directed to a method for generating a tissue image that includes “measuring the deformation of the tissue in a measuring plane defined by the sensor, *which sensor, during a varying pressure exerted on the tissue, is moved along the tissue in a direction transverse to the measuring plane.*” In other words, the sensor is moved along the tissue (e.g., withdrawn from a vessel) as signals for calculating tissue elasticity/hardness are acquired. As noted in paragraphs 0054 and 0055 of Applicants’ published application, such movement of the sensor resulted in a practically fixed artery wall position during a series of image frame acquisitions during a particular acquisition cycle.

Applicants request favorable reconsideration of the grounds for the rejection of the previously pending claims in view of Applicants' clarifying amendment and remarks. Please charge any fee deficiencies to Deposit Account No. 12-1216.

Applicants note the Office Action’s request to file a certified copy of the priority document and have submitted such document, in response to the request, to fulfill the requirement under 35 U.S.C. Section 119(b) and thereby establish a claim of priority to NL 1018864 filed on August 31, 2001.

Summary of the Rejections in View of the Prior Art

1. Claims 1-4 and 6-8 are rejected as anticipated under 35 U.S.C. Section 102(b) in view of Torp et al. US Pat. No. 6,099,471 (the Torp '471 patent).

2. Claims 5, 10-12, and 13-24 are rejected as obvious under 35 U.S.C. Section 103(a) over the Torp '471 patent in view of Panescu et al. US Pat. No. 5,848,969 (the Panescu '969 patent).

Applicants traverse the grounds for each and every rejection for at least the reasons set forth herein below. Applicants address the specific rejections in the order they arise in the Office Action.

Summary of Applicants' Disclosed/Claimed Invention

Applicants' claimed invention is directed to a method and apparatus for generating hardness/elasticity information of tissue subject to a varying pressure as a sensor is drawn in a direction transverse to a measuring plane defined by the sensor. The exemplary embodiment discloses a three-dimensional imaging procedure/apparatus wherein an intravascular ultrasound transducer is withdrawn along a section of a blood vessel, subjected to varying pressure during a cardiac cycle, to render a three-dimensional representation of the hardness/elasticity of the vessel tissue. Moving the sensor along the tissue, in the case of a cardiac cycle, has the advantage of minimizing motion of an artery wall in particular circumstances described in paragraphs 0054 and 0055 of Applicants' published application. Thus, while moving the sensor along a vessel's length has the overall effect of providing an image of a length of a blood vessel, in the short term the movement potentially minimizes the effect of an otherwise moving artery wall during a single data acquisition period.

Applicants' Response To The Office Action's 35 U.S.C. 102(b) Rejections

Applicants traverse the rejection, in section 3 of the Office Action, of claims 1-4 and 6-8 as anticipated by the Torp '471 patent. The Torp '471 patent is directed to generating a

strain image along a beam or two-dimensional cross-sectional slice generated from a set of beams. If anything, Torp teaches maintaining a motionless sensor during signal acquisition.

In the Torp '471 patent, an imaged area is defined by *a sensor that is not moved in a direction transverse to the measuring plane*. As shown in Figs. 2 and 4 of Torp, and the associated written description, the Torp disclosure is directed to generating image data along a beam within a single plane and no transverse motion of a sensor during acquisition is suggested or disclosed. With regard to Figs. 2 and 4, the accompanying written description contains multiple references to radial "beams" and neighboring beams in a same measuring plane. Furthermore, the Torp '471 patent describes correlating signals received at different times along a same beam to determine strain. Nowhere does the Torp '471 patent even remotely suggest generating a strain image/profile through the use of a sensor that, during a time of applying a varying pressure to tissue, is moved along the tissue in a direction that is transverse to the measuring plane of the sensor. In fact, the '471 patent does not even disclose a pullback device (which would be needed to pull back the sensor in a controlled/meaningful way). Instead, the Torp '471 appears to be concerned with snapshot cross-sections (or portions thereof) without movement of the sensor along the tissue.

With specific reference to the steps recited in Applicants' claim 1, the Torp '471 patent neither discloses nor suggests a method step as recited in claim 1 (and claims 2-4 and 6-8 that depend from claim 1) wherein "which sensor, during a varying pressure exerted on the tissue, is moved along the tissue in a direction transverse to the measuring plane." Thus, in contrast to the cited Torp '471 patent which acquires data from a *same transverse position* during acquisition of multiple sets of strain data, the recited invention requires moving the imaging sensor in a direction transverse to the plane of measurement. For at least these reasons, claims 1-4 and 6-8 are not anticipated by the Torp '471 patent.

Applicants also traverse the rejection of claim 2 for at least the reasons set forth above regarding acquiring signals in a three-dimensional space through the transverse displacement of the sensor during signal acquisition.

Applicants also traverse the rejection of claim 7 since Torp does not disclose receiving signals during practically continuous motion of the sensor.

Applicants' Response To The Office Action's 35 U.S.C. 103 Rejections

Applicants traverse the rejection, in **section 5** of the Office Action, of claims 5 and 10-12 as obvious over the Torp '471 patent in view of the Panescu '969 patent for at least the reasons set forth above with regard to claim 1. Applicants note however that Panescu does not even contemplate determining tissue stiffness or strain.

Applicants traverse the rejection, in **section 6** of the Office Action, of claims 13-24 as obvious over the Torp '471 patent in view of the Panescu '969 patent. Applicants have amended claim 13 to incorporate the disclosed feature of acquiring signal information while a varying pressure is exerted upon tissue and the sensor is moved along the tissue of interest in a direction transverse to a measuring plane defined by the sensor. In view of Applicants' previous remarks regarding independent claim 1 including similar elements, Applicants' submit that claims 13-24 are patentable over the prior art. The prior art simply does not disclose or even remotely suggest acquiring, by a sensor, signals for calculating elasticity/hardness of tissue while a varying pressure is asserted on tissue and while the sensor is moved in a direction transverse to the measuring plane.

Applicants acknowledge, with appreciation, the identification of patentable subject in claim 9 of the previously pending claims.

Applicants respectfully submit that the patent application is in condition for allowance. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



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Date: September 18, 2006

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